

SYNTAX

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MEMOTECH, PRINTER INCOMPATIBILITY SOLVED

Memotech reports the cause of Memopak/TS2040 printer incompatibility--3 unneeded printer capacitors (C4-C6). We (Jun.83) reported the cause as inadequate power supplies; this latter proved true for only some TS2040s. Contact Memotech to learn the needed modifications. Memotech Corp., 7550 W. Yale Ave., Denver, CO 80227, 303/986-1526. (See New Products' COMPUMENTOR for another fix.--LFV)

TS1500 RAM TROUBLE

Industry sources inform SYNTAX that testing of several RAMs--Memotech, Byte-Back, Gladstone, Persona, and D'ktronics--shows they will not work with current TS1500 demos. (Timex could still alter the retail models.) The reason: RAM CS is disabled (Timex RAMs do not modify RAM CS). TS1000 software, and hardware in the 8K-16K block (such as parallel printer ports, and some Memotech products) do work with demo 1500s. Timex plans to distribute 25-30,000 units about 9/1.

TS2068 UPDATE

TS2068s may grace your mailboxes by the end of September. Timex says Reagan's FCC cuts delayed approval. You can order products by direct mail from Timex--Timex Computer Corp., Waterbury, CT 06720, 203/573-5000. Telephone first to confirm price & model availability.

NETWORK INTERFACE FOR SPECTRUM

Sinclair Research announces the ZX Interface I, enabling 64-machine, 100 Kbaud local area networking and modem transmission. Available in about a month; priced about \$140 (US) with RS232 interface, software. Micro-X Ltd., 5 Coverdale Rd., Brondesbury, London NW21 4DB, UK, 011-44-1-459-1089. SYNTAX believes Timex will produce a similar device for the TS2068.

NEW PRODUCTS AND SERVICES

Surge clamping diodes, 0.21"x0.38" max. dimensions, 1" lead, 5V TTL, \$4.25. 11.1V, 15.3V \$4.50 each. P&H. Matthew Zenkar, 1432 Holcroft Rd., Rochester, NY 14612.

SyncMaster offers 10% discount on any TS software to users' groups that have published newsletters for at least six months. Send name, address, contact name, two most recent newsletters. SyncMaster, POB 511, Oak Ridge, NC 27310.

Solutions to exercises in The Complete Sinclair ZX81 and Timex TS 1000 BASIC Course (Melbourne House) for \$5/listing. 1K RAM. John B. Carson, Jr., 11200 Lockwood Dr., #307, Silver Spring, MD 20901.

The Computer NEWSletter indexes SYNTAX articles and other TS publications (TI, TS, Atari edition). 10 issues/yr./\$15. The Directory of Computer Books in Print lists publications. 5 updates/yr./\$10. The Computer NEWSletter, POB 952, Cleveland, OH 44120, 216/283-8871.

SUNRISE/SUNSET program calculates sunrise and sunset times. CALENDAR PLANNER stores year's personal events. Each tape 16K, \$9.95 (CA res. add tax.) I.M.S. Enterprises, POB 4503, Lancaster, CA 93539.

SCREEN-FILE index holds over 17,000 characters in only 16K, \$19.95. Banta Software, 8088 Highwood Way, Orangevale, CA 95662, 916/722-4895.

User's group members--10% off total purchase price until 9/25/83. 16-64K DATA MASTER \$5.95, 16K EXTENDER-6 TOOLKIT \$4.95, 2K or greater (Hunter NVM) NVM TOOLKIT \$4.95. L. Harmon, 4909 Clearlake Dr., Metairie, LA 70002.

JOGMATH teaches basic math skills. \$12.75 tape+\$1.25 P&H. ZX-PANDING, POB 25, Newton, NC 28658.

Microtrends Computer Festival and Expo for the Future, TS section. Ft. Mason Center, San Francisco, admission \$7.50. Micro Byte Productions, 1127 Pope St., St. Helena, CA 94574, 707/963-2983.

SCОВI (Software Controlled Video Inverter) inverts video display, merges with program. 16K, \$9.95. MXP Series solves complex expressions in math, physics, eng., \$20.95 ea., Nucleus module \$15.95, ea. 16K. SYBER INC., POB 972, Ocean Spring, MI 39564.

TS-ART graphics--sets any bkgrnd., defines new graphic commands, \$12.95+\$1.50 S&H. KSOFT CO., 845 Wellner Rd., Naperville, IL 60540.

E-Z Key joystick plugs into E-Z Key 60 keyboard, functions like arrow keys. \$29.95, E-Z Key, Suite 75, 711 Southern Artery, Quincy, MA 02169, 617/773-1187.

PI2040 printer interface allows peripheral compatibility with TS2040. Works with all Memotech products. Sold with PC2040 ribbon cable, has expansion connector for additional piggy-back add-ons. \$37.95 + \$2.50 P&H. COMPUMENTOR, Suite 405, 1919 14th St., Boulder, CO 80302. MC/VISA orders 800/458-5858 x577, in CO 800/458-4545 x577.

ZX Spectrum discounts: 16K \$122.43 (79.50 pounds), 48K \$156.31 (101.50 pounds). Micro-X Ltd., 5 Coverdale Rd., Brondesbury, London NW2 4DB, UK, 01-459-1089.

Glare-Guard designed for use with ZX/TS computers, fits 12" screen. Amber, reduces glare. \$6.95+\$1 P&H. R. Dyl, 15 Kilburn Ct., Newport, RI 02840, 401/849-3805.

Suburban Computer Fair, TS section, Norwood, MA, Sept. 24-25, \$4.50. Contact Linda Barbrick, Technology Mktng. Co., POB 122, Quincy, MA 02170, 617/773-5197.

SYNTAX ERRORS

Russell Crum reports an error in lines 750 and 800 in RETURN ON INVESTMENT (Aug.83 p.8) Change both from GOTO 830 to GOTO 820 to prevent endless looping for data combinations that cause iterative computations to fall below 0.1%.

Add MicroSync's phone number to VENDOR REPORTS (Jun.83). Micro-Sync, 162R Marlboro St., Keene, NH, 603/352-8575. Tech. help T, Th 3-6 PM, nontech. problems M-F 3-6 PM.

CLARIFICATION

Winky Board manufacturer Gerry Russell sent the following clarifications and additions to the Winky Board II review (Aug.83): The SAVE filter feature should be used only if high frequency RAM pack noise prevents SAVEing. LEDs indicate output, not recording levels. Use of tape head alignment as suggested in the manual improves LOADING. Kit assembly requires more than three solder joints. Burned out LEDs will be replaced free. Winky is not advertised as a tape sound conditioner or tape filter. Winky comes with a money-back guarantee if not happy. Gerry adds to USER FRIENDLY LEGAL ADVICE (Aug.83): It is legal to copy a purchased copyrighted tape for your personal use.

ZX/TS USERS' GROUPS

Hollywood, CA: Timex Users Co-op, Charles Miller, 1223 N. Hoover St., Los Angeles, CA 90029.

Ypsilanti, MI: Clive Norman, 554 Rosedale Rd., Ypsilanti, MI 48197.

Dallas, TX: New contact person: Julie Barrett, 2624 E. Park Blvd., Plano, TX 75024, 214/578-8255.

Hagerstown, MD: Jr. group, up to age 16, Toby Posch, 908 View St., Hagerstown, MD 21740.

VENDOR REPORTS AND NOTES

Brainchild's Gwen Marsh happily reports that all Kolorworks back orders are filled, and future deliveries should take about 4-6 wks. Kolorworks \$149.95, \$4.95 S&H, demo tape \$9.95. Brainchild, POB 506 Pewaukee, WI 53072, 414/691-3903.

Proprietary International's Randy Wear says delivery of ZT21000 co-processors will be delayed until about Oct. 1. PI, 131 LaSalle Rd., Streamwood, IL 60103, 608/255-2325.

SYNTAX and other customers cannot locate Frog Software or its principals by mail or phone. You can request a complaint form to initiate action if Frog has your money and you have nothing to show for it. Robert Abrams, Atty. General, Bureau of Consumer Fraud and Protection, State Capital, Albany, NY 12224, 518/474-5481.

Don't expect your Kopak keyboard until early October, and expect indefinite delays on Z-99 Compilers, reports Kopak's Robert Schiller. E-Z Loaders were being shipped at press time. Kopak, 119 Peter St., Union City, NJ 07087. 800/222-0903, in NJ 201/864-4410.

Downsway Electronics, UK, now manufactures TS RAM packs in Indio, CA. Downsway also distributes TS software by mail order and dealers in North America. Downsway California, Inc., 81824/D6 Trader Place, Indio, CA 92201, 619/342-1223.

Paul Hunter's nonvolatile memory board costs more as of Sept. 1. Basic 2K kit \$32.95, additional three 6116LP-3 \$19.00, \$1.95 S&H per order. Contact Paul for complete price list. Paul tells us he has sold over 1,000 kits in Japan, Australia and Malaysia, as well as throughout Europe and N. America. Paul Hunter, 1630 Forest Hills Dr., Okemos, MI 48864, 517/349-5650.

USER FRIENDLY LEGAL ADVICE--PT. II

Should you sell or license your program? Advantages to selling your program: you get more money more quickly, and avoid possible low royalties if the program sells poorly. If you sell, your contract should specify warranties and obligations post-sale (i.e., mods, debugging).

Licensing gives you more control. A license allows you to retain ownership and allows the licensee to use or distribute your program. You can license to companies in different parts of the world. You can impose trade secrecy limitations more easily in a license vs. sale agreement. You may get more income in royalties.

Run a credit check on any company you sell or license to, by requesting references or using a credit check service.

Understand the contract completely--US vs. world rights, the length of term and if rights return to you vs. company renewal option after the licensing period expires.

Most license agreements include royalties and an initial cash payment (advance against royalties). The licensee can recoup the advance out of your program's income before he pays your royalty. If you're offered no advance, you're not likely to make money.

NET MEANS NOTHING--an old lawyer's adage that's important to remember. If your royalty is calculated against net income from your program, the company can and will deduct their expenses (advertising, shipping, etc.) from gross income, calculating your royalty on a very small amount. Definition of income should be the company's entire proceeds from sales--the most common and fairest agreement.

Jonathan Wallace, Esq., 51 E. 42nd St., Suite 1601, NY, NY 10017 (Wallace's clientele includes software designers.--LFV)

HARDWARE REVIEW

Product: Memotext Word Processor
From: Memotech Corp.
7550 W. Yale Ave.
Denver, CO 80227
Price: \$49.95, \$4.95 S&H

At last--a commercial word processor for ZX/TS computers using standard word processing functions!

Memotech supplies its word processor on an EPROM. Its color coordinates with your computer and other Memotech add-ons. Mine sits behind my Memotech keyboard and parallel printer interfaces, and in front of my 64K Memopak and Byte-Back modem. Memotext supports both the Memotech RS232 and Centronics interfaces and works with many printers. My full-size Seikosha GP-250X printer produces nice copy with Memotext.

Features: you can input at a fast typing speed, two complementary files are supported (text and data files), you can set up prompts within your text, and you can justify your margins. You can word-wrap, move, search, exchange and underline or boldface if your printer supports these functions.

To use Memotext, turn it on with its own on/off switch after you see the K cursor. If you use a 64K RAM, first POKE in RAMTOP (POKE 16388,255, POKE 16389, 255, NEW) to give you maximum memory.

Memotext does not work with the Memotech HRG, despite an adequate power supply. Memotech knows about this problem and is working to solve it.

Overall, I am very pleased with Memotext. One minor gripe--Memotech should include actual screen examples of text in the manual, to facilitate use. But after spending a short amount of time with Memotext, everything falls into place. Thanks again, Memotech; keep up the good work.

Joseph Kernaghan, Hilton, NY

BEST KEYBOARD AVAILABLE!

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- Full size space bar
- Allows touch typing
- Rear cutout allows any RAM or expansion module to be plugged in
- Keyboard comes with own cables
- Keyboard case holds both keyboard and computer with room to spare
- High impact plastic case with vaporized metal shielding
- Easy assembly — no soldering, no modifications
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DEALER INQUIRIES WELCOME

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64K \$119.00 MX-64KP



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BETTER SCROLLING

SCROLL subroutines in the Sinclair 8K ROM run disappointingly slow with BASIC arcade-type graphics games, especially those using full graphic backgrounds. Several programming techniques can speed up SCROLLING functions to an acceptable level.

Type in listing one and RUN it. You'll see the inverse numbers and letters PRINTed slowly across the bottom of your screen.

```
10 REM LISTING ONE
20 REM SLOW SCROLL
30 SCROLL
40 FOR I=0 TO 31
50 PRINT CHR$(156+I)
60 NEXT I
80 GOTO 30
```

Improve this by filling in the bottom row with a 32-character string (B\$) as shown in listing two. Even so, the characters still visibly creep across the bottom, because the 8K ROM SCROLL routine collapses the last non-empty row down to a single ENTER character (118d) every time SCROLL executes. When you PRINT this collapsed bottom row, ROM subroutines rebuild it slowly, one character at a time.

```
10 REM LISTING TWO
20 REM BETTER SCROLL
30 LET B$="0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF"
40 SCROLL
50 PRINT B$
60 GOTO 40
```

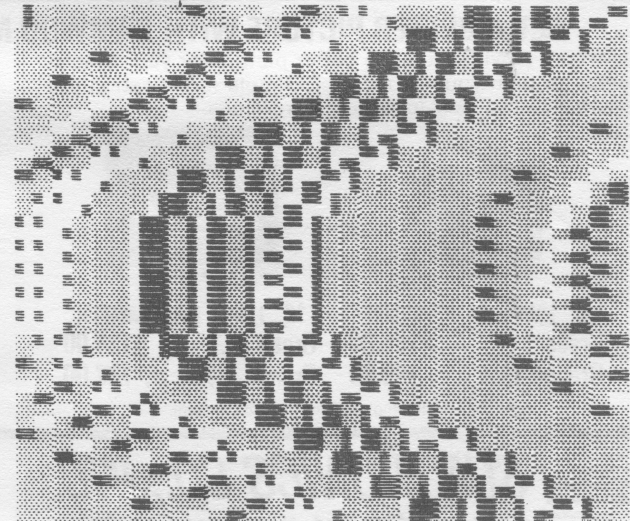
Listing three demonstrates an elegant solution to this problem (first described by John Oliger, SYNTAX, Apr.82 p.6). Line 50 PRINTs AT 21,31; this effectively rebuilds the collapsed bottom row to its full state almost instantly, rather than a character at a time. This line continues by PRINTing AT 21,0;B\$ to properly place the long string (B\$) on the bottom row. Now RUN listing three--you'll note that it runs significantly faster; the bottom row appears more quickly than the eye can follow.

```
10 REM LISTING THREE
20 REM FASTER SCROLL
30 LET B$="0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF"
40 SCROLL
50 PRINT AT 21,31;AT 21,0;B$
60 GOTO 40
```

Listing four demonstrates a way that the bottom of the screen can fill rapidly with a changing pattern of characters. Lines 30-50 initialize variables B\$, T, and A. Line 70 calculates a displacement (D) which varies with the sine of T and ranges from 1 to 31. Line 80 fools row 21 into the filled state (as above), then slices B\$ into two smaller strings of length D-1 and 32-D. This same line then PRINTs these smaller strings in reverse order for an amusing sine wave graphics display. (For variety, alter line 30 so that B\$ contains 32 graphics characters of your choice.) Experiment by using any function to alter the displacement. (I chose sine arbitrarily.)

```
10 REM LISTING FOUR
20 REM SINE SCROLL
30 LET B$="0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF"
40 LET T=0
50 LET A=PI/20
60 SCROLL
70 LET D=16+INT(15*SIN T)
80 PRINT AT 21,31;AT 21,0;B$(D TO 32)+B$(1 TO D-1)
90 LET T=T+A
100 GOTO 60
```

This sine wave display uses random graphics characters in line 30, listing four--LFV.



Listing five shows how to nearly double the speed of listing four. Lines 40-70 calculate all displacements ahead of time and store them in an array. When the slicing, PRINTing and SCROLLing execute in lines 100-130, the computer wastes no display time on the calculation of the trig (or other function). This technique, however, eats up quite a bit of memory in some applications.

```

10 REM LISTING FIVE
20 REM FASTER SINE SCROLL
30 FAST
40 DIM D(40)
50 FOR T=1 TO 40
60 LET D(T)=15+INT (15*SIN ((T
-1)/20*PI))
70 NEXT T
80 LET B$="XXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXX"
90 SLOW
100 FOR T=1 TO 40
110 SCROLL
120 PRINT AT 21,31:AT 21,0:B$(D
(T) TO 32)+B$(1 TO D(T)-1)
130 NEXT T
140 GOTO 100

```

These methods come in handy for speeding up any BASIC software that uses SCROLL. Try them in your graphics game programs.

Dan Tandberg, M.D., Albuquerque, NM

PROGRAM IMPROVEMENT

SAVE CHR\$ USR 832 "program name" works very well to save my unSAVEable programs (SYNTAX Jul.83 p.6). But the short time interval between LOAD and SAVE (about five seconds) prevents changing tapes to SAVE the program, as the author suggests. Instead, allow the system to go into SAVE and then press BREAK (obtaining an error report). Then LIST the program to find the line with SAVE "program name." Set your recorder in a normal, unpanicky time-frame. Next, enter GOTO (line number with SAVE). This method works well on all my unSAVEable programs. Congratulations to Gary for devising this trick.

Walter Kronk, Peabody, MA

SOFTWARE REVIEW

Program: ZXDIS Disassembler
Price: \$14.95
ROM/RAM required: 8K/16K
Printed listings: No
Program listable: Yes
Language: MC, some BASIC
From: Scientific Software
6 W. 61 Terrace
Kansas City, MO 64113

Scientific Software's second utility program seems as outstanding and useful as its first (ZXAD Assembler and Debugger). ZXDIS lets you to examine MC programs as standard Z80 mnemonics and not a sequence of numbers. You may display mnemonics or hexadecimal data and equivalent characters.

You can use ZXDIS easily. LOAD the disassembler with name "ZXDIS". After LOADING, it prompts you for a relocation address. You can relocate it anywhere in memory: below RAMTOP, between 2000H (8192) and 3FFF (16383), or remain at your original LOADING location. After relocation, run the utility by entering RAND USR #, where the # is specified by the utility before it moves. ZXDIS operates completely from MC with no BASIC required after relocation. RUN, then select the desired function from the menu by entering the correct character.

ZXDIS functions include MODE, PRINT, ADDRESS, LIST, MEMORY MODIFICATION, SEARCH, and TAPE/LOAD.

MODE switches the display between disassembly and hex format.

PRINT (P) switches between print and non-print modes.

ADDRESS displays a new address when you type a four-digit hex number. (Starting address is at location 0000H).

LIST function disassembles the next 16 instructions (disassembly mode) or 96 bytes (hex mode). Type four hex digits (an address) and L to display instructions or bytes from the current address through the address you entered.

Available from SYNTAX...

For computing beginners —

- Crash Course in Microcomputers**\$19.95
Covers hardware, machine language and applications. Reviewed in SYNTAX, Oct. 1981. Add \$1.50 shipping.
- ZX80 Pocket Book**\$10.95
Includes ZX81 supplement. Covers Sinclair BASIC, data and program listings. Add \$1.50 postage.

For advanced hardware/software users —

- Zilog's Z80-Z80A CPU Technical Manual**.....\$7.88
- Zilog's Assembly Language Programming**\$15.75
- Experiments in Artificial Intelligence**\$9.95
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MEMORY MODIFICATION allows you to modify the current byte by typing a two digit hex number.

SEARCH allows you to search for a byte of a particular value by entering a two-digit hex value and S. Your computer then searches forward for the value, and displays its address.

TAPE/LOAD function seems the most useful. It allows LOADING and LISTING of a program which self-RUNS after LOADING. After entering T, it prompts you to "start recorder and press ENTER." The machine LOADS the first program it comes to, ending with report code 9. You can then LIST, disassemble or SAVE.

After using two other disassemblers, ZXDIS wins my approval. It's user-friendly, simple to use, and gets the job done. I highly recommend it if you're interested in examining machine code or want to backup nonLISTable programs.

Travis L. Miller, Lee's Summit, MO

ZIP-TO-STATE, STATE-TO-ZIP--8K/16K

With lots of memory, many computers can convert a zip into the city and state. With a ZX/TS, you can convert zip to state with a short program.

Here's the technique we use at SYNTAX to make sure our zip and state match in our mailing list. In sample zip code 48503, the digit 4 determines one of ten national areas and the digits 85 determine the state. All zip codes follow this format. This program stores state abbreviations, and corresponding zip ranges in the arrays S\$ and Z\$. S\$ stores two-letter state abbreviations and corresponding places in Z\$ contain lower and upper ranges for the zip.

Note in the following chart the state abbreviation for Michigan (MI) in S\$, between Indiana (IN) and Iowa (IA). Number 85 in 48503 lies between the corresponding numbers in Z\$ (80 and 99). The two-letter zip code ranges are stored as that number's character.

```
S$="...|I|N|M|I|I|A|..."
Z$="...|60|79|80|99|00|28|..."
```

For each national area, we store the range in array C\$. For example, national area 0 is located in Z\$ and S\$ at positions 1-20. The characters for 1 and 20 are stored in C\$ positions 1 and 2.

First, type in the following program, typing 146 X's in line 1 and 20 X's in line 3. The X's hold memory locations that will contain data for zip-state conversions.

```
1 LET Z$="XXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
2 LET S$="UAPRMARINHMEVTCNTNUN
YNYPADEDCMDVAVUUVUANCSCGAFLUAALTNM
SUAKYUAOHUAIRINMIIAUAWIMNUASDUANDU
AMTILMOUAKSNEUALAUAROKTXCOUAWYI
DUAUTUAPAZUANMUANUACAHIGUORUARK"
3 LET C$="XXXXXXXXXXXXXXXXXXXXX
X"
10 FOR X=16518 TO 16563
20 INPUT G
30 POKE X,G
40 PRINT G;" ";
50 NEXT X
```


Now enter GOTO 10. At each prompt, type in one number in the following table (left to right, consecutively). Line 30 POKES the values for you.

0	5	6	9	10	27	28	29
30	38	39	49	50	59	60	69
70	89	90	99	0	49	50	96
97	99	0	5	6	19	20	46
47	68	69	69	70	89	90	99
0	19	20	40	41	49	50	69
70	85	86	97	98	99	0	27
26	29	30	58	59	59	60	79
80	99	0	28	29	29	30	49
50	67	68	69	70	77	78	79
80	88	89	89	90	99	0	29
30	58	59	59	60	79	80	93
94	99	0	14	15	15	16	29
30	49	50	99	0	16	17	19
20	31	32	38	39	39	40	47
48	49	50	55	56	69	70	84
85	89	90	98	99	99	0	56
67	68	69	69	70	79	80	94
95	99						

Now change line 10 to read:

```
10 FOR X=16832 TO 16851
```

Type in GOTO 10 then ENTER. Type in the following characters as you did previously.

1	20	21	26	27	40	41	54
55	66	67	86	87	98	99	108
109	134	135	145				

Now delete the previous lines 10-50 and add the following program, beginning at line 15. The following lines 1-3 show what your lines 1-3 should look like after you POKEd in the previous tables. To RUN the program, type in RUN and choose a menu option (zip-state or state-zip). Then enter either zip or state to see the corresponding match displayed.--RWK

```

1 LET Z#=""
2 LET S#="UAPRMARINHMEUTCTNUN
YNYPADEDCMDVANUQUANCSCGAFLUARLTNM
SUAKYUADHUA INMIIRUAMIMNUASDUANDU
AMTILMOUAKSNEUALAUAPROKTYCDUANYI
DUAUTUARZUANMUANVUACAHIGUORWAK"
3 LET C#=""
15 REM ZIP TO STATE OR RANGE
OF ZIP FOR A GIVEN STATE"
16 CLS
20 PRINT AT 0,0;"MAIN MENU"
30 PRINT AT 5,0;"TO GET STATE
FROM ZIP--HIT 'S'"
40 PRINT AT 7,0;"TO GET ZIP RA
NISE FROM STATE"AT 8,21;"--HIT
'Z'"
45 PRINT AT 10,0;"TO QUIT--S"
50 LET I#="INKEY#"
60 IF I#="" THEN GOTO 50
70 IF I#="S" THEN GOTO 500
80 IF I#="Z" THEN GOTO 5000
85 IF I#="Q" THEN GOTO 100
90 GOTO 50
100 CLS
110 PRINT AT 10,10;"BYE"
120 STOP
500 REM ZIP TO STATE.
505 CLS
510 PRINT "TYPE IN THE 1ST 3 CH
ACTS OF ZIP"
515 INPUT X#
516 IF CODE X#<28 OR CODE X#>37
OR LEN X#<>3 THEN GOTO 541
517 IF VAL X#<006 OR VAL X#>999
THEN GOTO 541
520 LET Z1=VAL X#(1)
525 LET Z2=VAL X#(2 TO 3)
530 FOR X=(CODE C#(Z1*2+1))+1 T
O CODE C#(Z1*2+2) STEP 2
535 IF Z2<=CODE Z#(X) THEN GOTO
545
540 NEXT X
541 PRINT "ZIP CODE ERROR, PLEA
SE TRY AGAIN"
542 GOTO 510
545 LET A#="S#(X-1 TO X)
550 IF A#="UR" THEN PRINT "THAT
ZIP CODE IS UNASSIGNED, PLEA
SE TRY AGAIN"
560 IF A#="UR" THEN GOTO 510
565 CLS
570 PRINT AT 0,0;"THAT ZIP CODE
IS IN THE STATE"AT 10,10;"
"AT A#;"
580 PRINT AT 13,2;"PRESS ENTER
TO GO BACK TO MAIN MENU."
590 LET I#="INKEY#"
600 IF I#="CHR# 118 THEN GOTO 15
610 GOTO 590
5000 REM STATE TO ZIP
5010 CLS
5020 PRINT "TYPE THE 2-LETTER ST
ATE ABBREV"
5030 INPUT X#
5032 IF CODE X#<38 OR CODE X#>83
OR LEN X#<>2 THEN GOTO 5090
5090 CLS

```

Join the Click!

NOT JUST A KEYBOARD REPLACEMENT
 BUT AN ENHANCEMENT THAT GIVES
 KEYBOARD FEATURES FOUND ONLY
 ON MORE EXPENSIVE COMPUTERS.

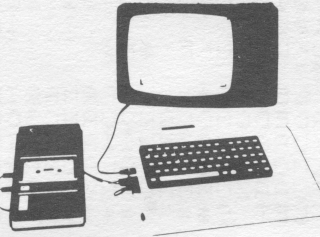
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 WITH YOUR E-Z KEYBOARD . . .**

Here at last, is a large 60 key TACTILE FEEL keyboard that plugs into the same connectors as the existing keyboard on your Z801, TIME-X/SINCLAIR 1000 or 1500. **HERE THE CLICK . . . FEEL THE SNAP!** for every key pressed (tactile feedback).

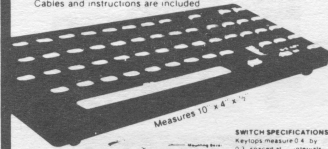
IT'S THE ONLY KEYBOARD WITH ALL OF THESE FEATURES:

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- No wiring required (Just plug-in)

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A custom designed aluminum enclosure (shown above) is available for your E-Z Key keyboard.
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 EC-11 (11" X 9" X 3.5") 24.95
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JOYSTICK
 A joystick kit that requires no wiring and functions like the arrow keys and D on your computer. Plugs into E-Z Key 60 keyboard. 29.95



\$84.95
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Keypads measure 2 1/4" by 2 1/4" spaced at 1/8" intervals between keys. Life equals 10 million operations (typical). Force equals three ounces. Dome-switch button type with arm to give extended travel.

Try it, you'll like it! - 10 day return privilege on keyboard enclosures and keyboard in stock.

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Qty	Item	Unit Cost	Item Total	S & H Unit Cost	S & H Total
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	Sub totals				
	Mass. residents add 5% sales tax				
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E-Z KEY
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 711 Southern Artery
 Quincy, Massachusetts 02169
 (617) 773-1187

Signature _____
 Name _____
 Address _____
 City _____ State _____ Zip _____

```

5035 IF X#="NY" THEN GOTO 5250
5040 FOR X=1 TO 145 STEP 2
5045 IF X$(1)=S$(X) THEN IF X$(2)
) =S$(X+1) THEN GOTO 5050
5050 NEXT X
5055 GOTO 5090
5060 FOR Y=2 TO 20 STEP 2
5070 IF X<CODE C$(Y) THEN GOTO 5
100
5080 NEXT Y
5090 PRINT "STATE ERROR, PLEASE
TRY AGAIN"
5095 GOTO 5020
5100 LET Y#=-STR# (Y/2-1)
5110 LET Y#=-STR# (Y/2-1)
5120 LET U#=-STR# (CODE Z$(X))
5130 LET U#=-STR# (CODE Z$(X+1))
5140 IF U#="0" THEN LET U#="00"
5150 IF U#="0" THEN LET U#="00"
5200 PRINT "THE ZIP CODE RANGE IS
OR "X#" "15" ") AT 10,10;Y#)U#)
"00";Y#;U#;"99"
5210 GOTO 580
5250 PRINT "THE ZIP CODE RANGE IS
OR NY 15" ") AT 10,10;"090000-149
99"
5270 GOTO 580
8999 STOP
SYNTACTIC SUM: 44581, 8K ROM
  
```

Artisans bring life to dreams and shape futures by subtle choices of design and execution. Our founding editor, Ann L. Zevnik, led Syntax

to excellence, accuracy and utility with her consummate skills. Ann's influence will remain; Ann will not. We will miss her wit, craft, and knowledge. To those who follow we commend this maxim: if I see farther than others, it is because I stand on the shoulders of giants. Farewell ALZ; find a great dream.

PROGRAM ACCESS SECURITY SYSTEM

This short machine code program prevents program access without a code after you LOAD your program. You set your own personal security code. If someone tries to enter the wrong code, the keyboard locks up, forcing the user to power down and reLOAD. When you enter the right code, you can RUN, LIST, and use the program as usual.

PROGRAM ACCESS works through a small subroutine that scans the keyboard after storing the machine codes of each letter in the five-letter password. If the five letters match the stored code, the user gains access. If not, the keyboard locks.

In the printed listing, lines 1-4 add the security mechanism and self-SAVE routine. Lines 10-60 allow you to enter your code. Our sample program begins at line 100.

We suggest typing in the program as listed, using the access code SYNCE. Then, you can change the code or program as desired. (You will get a different Syntactic Sum when you do this.) SAVE the entire routine after you type it in by hitting RUN then ENTER. When you LOAD the program again, it comes up RUNNING and asks for the secret access code.

To enter the machine code in 1 REM, you can POKE in the following values, beginning at address 16514. Note that the bytes in addresses 16657-16662 do not appear in the listed REM statement. (See HIDDEN REMS for an explanation.--LFV)

Lawrence Coulter, Chelsea, MA

Some SYNTAX readers have expressed concern that we may not publish a problem that reflects negatively on a SYNTAX advertiser. In fact, we generally don't publish problems without an answer. Our policy: publish solutions to problems, regardless of product. We offer you more than a newsletter catalog of problems. You own the equipment--you know the problems and need solutions. When we know, you read it in SYNTAX.

Kirtland H. Olson, Publisher

DEAR EDITOR:

After one roll of paper, my ZX printer appeared slightly ill; by the end of roll two, cancer set in. ZX could not LLIST even a five-line program legibly. Terrible grinding sounds emanated from inside. ZX needed major surgery.

I timidly removed the four long corner screws from the bottom, then jiggled the top cover free, and easily unclipped the revealed single white wire. I removed the top cover to see the motor, pulleys and belt that move the little wire styli. I noted with disgust that black, irregular crud coated the belt. I removed the belt, cleaned it with a toothbrush, and placed it back on the pulleys. (Use care here not to damage the styli.)

It took several attempts to reassemble the printer, since the cable, feed switch and axles must line up correctly with the top cover. (Make sure to reconnect the white wire.) My ZX printer now runs beautifully.

Dan Tandberg, M.D., Albuquerque, NM

Here's a tip for those who tackle expansion kits. I paid the hard way to learn that the keyed Timex plug-in modules can cause serious damage when plugged into an exposed board edge connector. I ruined a 16K RAM by feeling for the

key-in-slot registration without looking at the connection. When I turned on the power, the screen displayed strange activities and my RAM pack had died. Of course, I had an uncased kit module between the computer and RAM pack. So for those who build kits that may not be cased right away, magic-glue a small segment of plastic board perpendicular to the end of the board edge connector. Or, cement thin plastic plates on the outside of the 46-pin sockets. (Some of these already fit closely in housed units; Sinclair chose to cut down 50-pin connectors.)

If you computerize model railroads, please contact me.

Bruce Kott, 4360 Rolfe Rd.
San Diego, CA 92117

So. Bay Computer Club collected these conversion formulas:

```
***** BASIC *****
----- NORMAL TO SINCLAIR -----

"DATA" USE: LET N(X)=NUMBER
           LET A$(X)="STRING"

"READ" USE: FOR X = 1 TO J

"ON X GOSUB" USE:
              IF X = J THEN GOSUB

"SET" USE: PLOT

"RESET" USE: UNPLOT

"LEFT$(A$,N)" USE: A$(1 TO N)

"MID$(A$,M,N)" USE:
                 A$(M TO M+N-1)

"RIGHT$(A$,N)" USE:
                 A$(LEN A$-N+1 TO )

"DEFINING FUNCTION" USE:
                       LET A$="FUNCTION"
                       LET X=VAL (A$)

***** FORMAT AIDS *****

"ROUNDING" USE:
              X=INT (X*100+.5)/100

"RIGHT JUSTIFY" USE:
                  LET C=COLUMN NUMBER
                  PRINT TAB (C-LEN (STR# (INT
                  (X))))X
```

John Petersen, Manhattan Beach, CA

I wired an Atari joystick to my ZX81 following the procedure in SYNTAX (Jun.82). The joystick works fine, but I can't LLIST or LPRINT. What's wrong?

Gary Hawkins, Weyerhauser, WI

Both of these functions are on one diode line; perhaps the long wires cause difficulty. Check for solder bridges or other partial shorts on your connections. It's not normal for any connection we recommend to disable the computer, BUT long wires on the keyboard connector do cause trouble, often with shifted functions. Installing a connector with short leads would be a simple fix; just remove the joystick when not using it. Replacing the cable with one having lower capacitance between wires would be a superior repair. Use ribbon cable with parallel conductors. Connect every other wire to replace the six you need, and leave the others disconnected.--KO

Here's how I rebuilt my power supply to avoid ZX81 crashes. My original power supply had only a 1000 uF capacitor with 1 Amp maximum output voltage regulator inside. I rebuilt it with a Radio Shack LM350T voltage regulator with a maximum 3 Amp output. My two unused 54,000 uF capacitors also went in, between the full wave rectifier and regulator. I also added a 20,000 uF capacitor between the regulator and computer for additional smoothing of DC voltage. A timer delays the computer's start by 12 seconds, allowing the capacitors 8 seconds to fully charge.

Ken Norton, Whitehall, MI

I have a more in-depth solution than the one published in response to a question from Paul Crecca (SYNTAX, DearEd, May.83). Here's how to modify VU-FILE to run with QSAVE.

1. Hit BREAK to see BASIC listing.
 2. Make the following changes:
1100 DIM F\$ (9200)
3690 PRINT USR 32383
9995 FAST
- Add 9996 PRINT USR 32383
3. POKE 19151,0
 4. CLEAR
 5. SAVE the revised program, using ZX81 SAVE command.
 6. LOAD QSAVE
 7. LOAD the revised program, using ZX81 LOAD command.
 8. Put a fresh tape in the recorder, set to record, GOTO 9995.
- VU-FILE now SAVES itself in QSAVE format. It comes up RUNning on reLOADing, ready for use. It still asks for you to enter a name prior to SAVEing files, even though QSAVE does not use this feature. VU-FILE stores the name and will label the file with the Inform command.

W.D. Stevens, Tulsa, OK

When POKEing in machine code to run my Zebra joystick, I hit the Z key to exit, causing a repeat of the last CODE I entered. Use this program (with any addresses) to cut down typing of repetitive codes.

```
10 FOR X=8192 TO 8220
20 INPUT Z
30 POKE X,Z
40 PRINT PEEK X
50 NEXT X
```

When you INPUT Z, you POKE the last code entered into the X address. Then you can hit Z to repeat codes.

Michael Bowman, Arab, AL

I developed a method of making a tape with test tones to check my recorder's head alignment. I recorded my stereo test record (from High Fidelity magazine) on my stereo cassette recorder. I used that tape to test my monaural (Sony TR-215) recorder. The test tones sound fine past 8000 cps, indicating good azimuth.

Robert Jenkins, Chicago Heights, IL

DISTANCE--8K/16K

DISTANCE computes the shortest distance and true bearing from any point on the earth's surface to any other location.

Type in this easy-to-use program (line 10 has 97 spaces) and input geographical coordinates when prompted. Get latitude and longitude from a map or almanac. Enter coordinates in degrees and tenths (six minutes is 1/10 degree); enter east longitude or south latitude as a negative number, to distinguish from west and north. For example, enter 18 degrees, 30 min. east, and 27 degrees, 18 min. north as -18.5 and 27.3. Your computer then calculates bearings in true (not magnetic) north and distance in land (statute) miles, nautical miles and kilometers.

When you get another reading, you can keep or change your initial start point (K/C). SAVE the program with GOTO 4000.

Beginners can learn from sub-routines earmarked with REMs in this well prompted listing. For example, GOTO 9977 to use a line renumbering routine. (This routine will not renumber GOTO and GOSUB statements in the main listing; you must change these yourself.)

DISTANCE serves as a sub-routine in longer sea/air navigation programs. I sell this and another 16K program for use with ham radios that calculates distance/direction. Each tape costs \$5.

William Bosley, K3NN, 201 Highland St., Valparaiso, FL 32580

```
1 REM (C)82, BOSLEY, K3NN
2 REM XXXXXXXXXX
3 REM X# USED TO ERASE
10 LET X#=""

20 LET S#="*****"
*****
30 CLS
40 PRINT TAB 5;"BEARING AND DI
STANCE"
49 REM INPUT START COORDINATES
```

```
50 PRINT AT 9,2;"ENTER START P
OINT LONGITUDE",,TAB 5;"(DEGREE
S AND TENTHS)",,TAB 8;"( - FOR
EAST)"
59 REM INPUT START LONGITUDE
60 GOSUB 3000
69 REM C#= INPUT LONG OR LAT
IN DEGREES
G=START LONG IN DEGREES
70 LET G=VAL C#
79 REM G#=LONG IN DEGREES WITH
"WEST" OR "EAST" INDICATED
80 LET G#=STR# G+" WEST"
90 IF SGN G=-1 THEN LET G#=STR
# ABS G+" EAST"
99 REM CONVERT DEG TO RADIANS
100 LET G=G*PI/180
110 CLS
119 REM DISPLAY START LONG
120 PRINT "FROM: ";G#
130 PRINT AT 9,2;"ENTER START P
OINT LATITUDE",,TAB 5;"(DEGREES
AND TENTHS)",,TAB 8;"( - FOR S
OUTH)"
139 REM INPUT START LATITUDE
140 GOSUB 3000
149 REM E=START LATITUDE (DEG)
150 LET E=VAL C#
159 REM CHECK LIMITS
160 IF E<=-90 AND E>=-90 THEN GO
TO 190
169 REM OUT OF LIMITS
170 PRINT AT 16,0;X#;X#;AT 18,0
;S#;" MUST BE BETWEEN 90 AND -90
DEG",TAB 8;"PLEASE REENTER",S#
180 GOTO 140
189 REM E#=START LAT N/S
190 LET E#=STR# E+" NORTH"
200 IF SGN E=-1 THEN LET E#=STR
# ABS E+" SOUTH"
209 REM CONVERT TO RADIANS
210 LET E=E*PI/180
219 REM DISPLAY START LAT
220 PRINT AT 1,6;E#
299 REM INPUT END POINT COORD
399 REM ERASE BOTTOM OF SCREEN
1000 PRINT AT 4,0;X#;X#;X#;X#;X#
;X#
1010 PRINT AT 9,3;"ENTER END POI
NT LONGITUDE",,TAB 5;"(DEGREES
AND TENTHS)",,TAB 8;"( - FOR EA
ST)"
1019 REM INPUT END LONG
1020 GOSUB 3000
1029 REM H=END LONG (DEG)
1030 LET H=VAL C#
1039 REM H#=END LONG E/W
1040 LET H#=STR# H+" WEST"
1050 IF SGN H=-1 THEN LET H#=STR
# ABS H+" EAST"
1059 REM CONVERT TO RADIANS
1060 LET H=H*PI/180
1069 REM DISPLAY END LONG AND
ERASE REST OF SCREEN
1070 PRINT AT 4,0;"TO: ";H#;AT
7,0;X#;X#;X#;X#;X#
1080 PRINT AT 9,3;"ENTER END POI
NT LATITUDE",,TAB 5;"(DEGREES A
ND TENTHS)",,TAB 8;"( - FOR SOU
TH)"
1089 REM INPUT END LAT
1090 GOSUB 3000
1099 REM F=END LAT IN DEGREES
1100 LET F=VAL C#
```



```

1109 REM CHECK LIMITS
1110 IF F<=-90 AND F>=-90 THEN GO
TO 1140
1119 REM OUT OF LIMITS
1120 PRINT AT 16,0;X#;X#;AT 16,0
;S#;" MUST BE BETWEEN 90 AND -90
DEG",TAB 6;"PLEASE REENTER",S#
1130 GOTO 1090
1139 REM F#=END LAT N/S
1140 LET F#=STR$ F+" NORTH"
1150 IF SGN F=-1 THEN LET F#=STR
$ ABS F+" SOUTH"
1159 REM CONVERT TO RADIANS
1160 LET F=F*PI/180
1169 REM DISPLAY END LAT AND
ERASE REST OF SCREEN
1170 PRINT AT 5,6;F#;AT 7,0;X#;X
#;X#;X#;X#
1998 REM           CALCULATION          
1999 REM CRASHPROOFING
2000 IF F=0 OR F=-E OR F=-PI/2 T
HEN LET F=F+.00017
2009 REM L=DIFFERENCE IN START
AND END LONGITUDES
2010 LET L=G-H
2019 REM ADJUST QUADRANT
2020 IF L>PI THEN LET L=L-2*PI
2030 IF L<-PI THEN LET L=L+2*PI
2039 REM CRASHPROOFING
2040 IF INT (2*L/PI)=2*L/PI THEN
LET L=L+.00017
2049 REM A=INTERIM PARAMETER
2050 LET A=ATN (COS L*(COS F/SIN
F))
2059 REM C=TRUE BEARING (RADIANS)
2060 LET C=ATN (SIN A/((COS L/SI
N L)*COS (E+A)))
2069 REM CONVERT TO DEGREES AND
ADJUST QUADRANT
2070 IF SGN L=1 AND SGN C=1 THEN
LET C=C*180/PI
2080 IF SGN L<>SGN C THEN LET C=
180*(1+C/PI)
2090 IF SGN L=-1 AND SGN C=-1 TH
EN LET C=180*(2+C/PI)
2099 REM NM=DIST (NAUTIAL MILES)
2100 LET NM=(3437.7468*ACS (SIN
E*SIN F+COS E*COS F*COS L))
2109 REM ROUNDOFF C TO INT DEG
2110 LET C=INT (C+.5)
2119 REM SM=STATUTE MILES
2120 LET SM=INT (1.1515152*NM+.5
)
2129 REM KM=KILOMETERS
2130 LET KM=INT (1.853184*NM+.5)
2139 REM ROUNDOFF NM
2140 LET NM=INT (NM+.5)
2149 REM B#=BEARING EXPRESSED AS
A 3 DIGIT NUMBER IN DEGREES
2150 LET B#=STR$ C
2160 IF LEN B#=3 THEN GOTO 2190
2170 LET B#="0"+B#
2180 GOTO 2180
2189 REM DISPLAY RESULTS
2190 PRINT AT 9,0;"BEARING:",B#;
" DEGREES",,";"DISTANCE:",NM;" NA
UT MI",,SM;" STAT MI",,KM;" KILO
METERS"
2199 REM           ANOTHER GO ?          
2200 PRINT AT 19,0;S#;" ANOTHER
COMPUTATION? (Y/N)?"",S#
2210 PAUSE 33333
2219 REM CONT UNLESS "N" PRESSED
2220 IF INKEY#<>"N" THEN GOTO 22
60

```

```

2230 CLS
2239 REM MAKE FRIENDLY
2240 PRINT AT 10,13;"BYE",,,TAB
7;"HAVE A NICE DAY"
2250 STOP
2260 PRINT AT 20,0;"KEEP OR CHAN
GE START POINT (K/C)?"
2270 PAUSE 33333
2280 LET C#=INKEY#
2289 REM REJECT <ENTER>
2290 IF C#="" THEN GOTO 2270
2299 REM GOTO "ENTER END POINT"
2300 IF C#="K" THEN GOTO 1000
2310 IF C#="C" THEN RUN
2319 REM "K" OR "C" NOT PRESSED
2320 PRINT AT 15,0;S#;" PLEASE
ANSWER THE QUESTION",S#
2330 GOTO 2270
2999 REM ENTER DEGREES-CHECK FOR
-180 TO +180
3000 INPUT C#
3009 REM REJECT <ENTER>
3010 IF C#="" THEN GOTO 3000
3019 REM 1ST CHARACTER MUST BE
NUMBER, MINUS SIGN, OR
DECIMAL POINT
3020 IF C#(1)<>"-" AND C#(1)<".
OR C#(1)>"9" THEN GOTO 3100
3029 REM ALL OTHER CHARACTERS
MUST BE NUMBER OR DECIMAL
POINT
3030 FOR I=2 TO LEN C#
3040 IF C#(I)<". OR C#(I)>"9" T
HEN GOTO 3100
3050 NEXT I
3059 REM CHECK LIMITS
3060 IF VAL C#<=-180 AND VAL C#>=
-180 THEN RETURN
3099 REM           ERROR          
3100 PRINT AT 19,0;X#;AT 18,0;S#
;TAB 11-LEN C#/2;"CANT BE ";C#;T
AB 8;"PLEASE REENTER",S#
3110 GOTO 3000
3998 REM           AUTO START / SAVE / LOAD          
3999 REM CLEAR TO CUT LOAD TIME
4000 CLEAR
4010 FAST
4020 SAVE "DISTANCE"
4030 PRINT AT 9,11;"BOSLEYS",,,T
AB 11;"BASEMENT",,,TAB 9;"LABORA
TORIES"
4040 PAUSE 250
4050 RUN
9966 REM           PROGRAMMING AID          
          NOT PART OF PROGRAM          
9967 STOP
9968 LET A=16509
9969 INPUT S
9970 PRINT S
9971 LET L=256*PEEK A+PEEK (A+1)
9972 IF L=6 THEN RETURN
9973 IF L>9966 THEN GOTO 9976
9974 LET A=A+4+PEEK (A+2)+256*PE
EK (A+3)
9975 GOTO 9971
9976 PRINT S;" NOT FOUND"
9977 PRINT "LAST LINE TO BE RENU
MBERED=";
9978 GOSUB 9966
9979 LET AE=A+3
9980 PRINT "1ST LINE TO BE RENU
MBERED=";
9981 GOSUB 9966
9982 PRINT "1ST NEW LINE NUMBER="
;

```

```

9983 INPUT N
9984 PRINT N,"INCREMENT BY=";
9985 INPUT I
9986 PRINT I
9987 IF A>AE THEN GOTO 9997
9988 IF N>9986 THEN GOTO 9999
9989 LET M=INT (N/256)
9990 POKE A,M
9991 POKE (A+1),N-256*M
9992 LET LE=PEEK (A+2)+256*PEEK
(A+3)
9994 LET A=A+4+LE
9995 LET N=N+I
9996 GOTO 9987
9997 PRINT ",RENUMBER COMPLETE"
9998 STOP
9999 PRINT ",CANT COMPLETE. LIN
E NR >9965"
SYNTACTIC SUM: 3758, 8K ROM

```

RHYTHM-FUN--8K/16K

RHYTHM-FUN teaches basic rhythm timing and sight reading for quarter notes. Simply type in the program and RUN. You'll see four measures of 4/4 time displayed, with varied notes and rests. (Of course, your computer makes no sound.) Press ENTER to see more randomly generated combinations.

Use RHYTHM with your students or children. Instruct them to count the beats displayed on screen by clapping hands, tapping, whistling, or playing an instrument. You can play different notes for each bar to teach scales and reinforce note recognition.

Change line 950 PAUSE 4E4 so displays change automatically. For example, PAUSE 600 programs a display change about every ten seconds, allowing hands-free program use when playing an instrument.

In my experience as a music educator, RHYTHM and other similar programs dramatically increase student participation and proficiency in exercises that previously required memorization.

Individuals or software companies may contact me for sale of my 12-Program Music Reading Library (from quarter- to 16th-notes and triplets) and six-program music theory course.

John Dowlan, 8341 Boyce St.
Spring Hill, FL 33526

```

1 REM *****
2 REM * "RHYTHM-FUN"
3 REM * BY JOHN DOWLAN-1983 *
4 REM *****
5 REM QUARTER NOTES AND RESTS
6 REM I#:=GRAPHIC "3") DRAW
7 REM U#:=GRAPHIC "8") QUARTER
8 REM A#:=GRAPHIC "T") NOTE
9 REM B#:="/" (REST-DON'T PLAY)
10 REM MODIFY LINE 950 FOR
HANDS-FREE OPERATION
11 LET I#=""
12 LET U#=""
13 LET A#=""
14 LET B#=""
15 PRINT AT 0,0;"*****"
*****
16 PRINT
17 PRINT TAB 2;"THIS IS A MUSI
C RHYTHM SIGHT"
18 PRINT TAB 3;"READING PROGRA
M USING ONLY"
19 PRINT TAB 4;"QUARTER NOTES
AND RESTS"
20 PRINT TAB 10;"IN 4/4 TIME"
21 PRINT
22 PRINT TAB 13;"<<>>"
23 PRINT
24 PRINT TAB 1;"VARY TEMPO (SP
EED) AS DESIRED"
25 PRINT
26 PRINT "*****"
*****
27 PRINT AT 20,3;"PRESS ENTER
KEY TO BEGIN"
28 PAUSE 4E4
29 CLS
30 FAST
40 PRINT TAB 9;"QUARTER NOTES"
50 PRINT
60 PRINT TAB 6;"COUNT 1 - 2 -
3 - 4"
70 PRINT AT 5,2;"4"
80 PRINT AT 7,2;"4"
90 PRINT AT 5,1;"1"
100 PRINT AT 12,30;"1"
110 PRINT AT 3,0;"-----"
-----
120 PRINT AT 9,0;"-----"
-----
130 PRINT AT 15,0;"-----"
-----
140 FOR Y=27 TO 33
150 PLOT 0,Y
160 PLOT 80,Y
170 NEXT Y
180 FOR Y=15 TO 21
190 PLOT 0,Y
200 PLOT 80,Y
210 NEXT Y
220 LET J=RND
230 IF J<.6 THEN PRINT AT 6,4;A
#;AT 5,4;U#;AT 4,4;I#
240 IF J>.6 THEN PRINT AT 6,4;B
#
250 PRINT AT 8,4;"1"
260 LET J=RND
270 IF J<.6 THEN PRINT AT 6,7;A
#;AT 5,7;U#;AT 4,7;I#
280 IF J>.6 THEN PRINT AT 6,7;B
#
290 PRINT AT 8,7;"2"
300 LET J=RND
310 IF J<.6 THEN PRINT AT 6,10;
A#;AT 5,10;U#;AT 4,10;I#

```



```

320 IF J>.6 THEN PRINT AT 6,10;
B#
330 PRINT AT 8,10;"3"
340 LET J=RND
350 IF JK<.6 THEN PRINT AT 6,13;
A#;AT 5,13;U#;AT 4,13;I#
360 IF J>.6 THEN PRINT AT 6,13;
B#
370 PRINT AT 8,13;"4"
380 FOR Y=27 TO 33
390 PLOT 32,Y
400 NEXT Y
410 LET J=RND
420 IF JK<.6 THEN PRINT AT 6,19;
A#;AT 5,19;U#;AT 4,19;I#
430 IF J>.6 THEN PRINT AT 6,19;
B#
440 PRINT AT 8,19;"1"
450 LET J=RND
460 IF JK<.6 THEN PRINT AT 6,22;
A#;AT 5,22;U#;AT 4,22;I#
470 IF J>.6 THEN PRINT AT 6,22;
B#
480 PRINT AT 8,22;"2"
490 LET J=RND
500 IF JK<.6 THEN PRINT AT 6,25;
A#;AT 5,25;U#;AT 4,25;I#
510 IF J>.6 THEN PRINT AT 6,25;
B#
520 PRINT AT 8,25;"3"
530 LET J=RND
540 IF JK<.6 THEN PRINT AT 6,28;
A#;AT 5,28;U#;AT 4,28;I#
550 IF J>.6 THEN PRINT AT 6,28;
B#
560 PRINT AT 8,28;"4"
570 LET J=RND
580 IF JK<.6 THEN PRINT AT 12,4;
A#;AT 11,4;U#;AT 10,4;I#
590 IF J>.6 THEN PRINT AT 12,4;
B#
600 PRINT AT 14,4;"1"
610 LET J=RND
620 IF JK<.6 THEN PRINT AT 12,7;
A#;AT 11,7;U#;AT 10,7;I#
630 IF J>.6 THEN PRINT AT 12,7;
B#
640 PRINT AT 14,7;"2"
650 LET J=RND
660 IF JK<.6 THEN PRINT AT 12,10;
A#;AT 11,10;U#;AT 10,10;I#
670 IF J>.6 THEN PRINT AT 12,10;
B#
680 PRINT AT 14,10;"3"
690 LET J=RND
700 IF JK<.6 THEN PRINT AT 12,13;
A#;AT 11,13;U#;AT 10,13;I#
710 IF J>.6 THEN PRINT AT 12,13;
B#
720 PRINT AT 14,13;"4"
730 FOR Y=15 TO 21
740 PLOT 32,Y
750 NEXT Y
760 LET J=RND
770 IF JK<.6 THEN PRINT AT 12,19;
A#;AT 11,19;U#;AT 10,19;I#
780 IF J>.6 THEN PRINT AT 12,19;
B#
790 PRINT AT 14,19;"1"
800 LET J=RND
810 IF JK<.6 THEN PRINT AT 12,22;
A#;AT 11,22;U#;AT 10,22;I#
820 IF J>.6 THEN PRINT AT 12,22;
B#

```

```

830 PRINT AT 14,22;"2"
840 LET J=RND
850 IF JK<.6 THEN PRINT AT 12,25;
A#;AT 11,25;U#;AT 10,25;I#
860 IF J>.6 THEN PRINT AT 12,25;
B#
870 PRINT AT 14,25;"3"
880 LET J=RND
890 IF JK<.6 THEN PRINT AT 12,28;
A#;AT 11,28;U#;AT 10,28;I#
900 IF J>.6 THEN PRINT AT 12,28;
B#
910 PRINT AT 14,28;"4"
920 PRINT AT 19,0;A#;AT 18,0;U#;
AT 17,0;I#
930 PRINT AT 18,1;"=PLAY NOTE";
AT 18,12;"""/"="REST-DON'T PLAY"
940 PRINT AT 21,0;"(PRESS ENTER
KEY FOR NEW CHART)"
950 PAUSE 454
960 CLS
970 GOTO 30
980 SAVE "RHYTHM-FUN"
990 GOTO 15
SYNTACTIC SUM: 53648, 8K ROM

```

HIDDEN REMS

In PROGRAM ACCESS SECURITY SYSTEM, location 16657 contains the code 126. This code tells the computer that the next five bytes (in 16658-16662) are a numerical constant. The display ignores the six bytes, and does not print them in the REM statement. Why?

When you enter a numerical constant, say 999, the computer stores this as the three bytes representing 999, followed by code 126 and five bytes that represent the floating point binary equivalent of 999. LIST never displays the 126 or the following five bytes, avoiding a screen full of binary numbers.

Use this trick to hide information in your REM statements. To hide a copyright message, for example, type in the following line.

```
10 REM XCOPY XRIGHTX1983.
```

Now POKE the locations of each X-16517, 16523 and 16529--with code 126. Only the graphics remain.

```
10 REM
```

PEEK these locations and you will see the hidden message. Do this anytime by preceding every five characters with an X (which you POKE to CHR\$(126)).--RWK

CHEAP POWER

Surplus power supplies can double a ZX/TS's load capabilities. I use an Arizona Electronic Surplus supply inside a big keyboard; no more worries about power despite the many peripherals I add to my ZX/TS. Each unit costs \$5.50 (2 for \$10) and provides a regulated 5V, 2A output and 9-10V filtered, but unregulated. Each comes with a transformer and a 4" X 2.3" heat sink. Except for the transformer, all parts sit on a PC board. You add the line cord and hook the unit up to your ZX/TS. The unit comes assembled, but uncased from Arizona Electronic Surplus, 12627 N. Cave Creek Rd., Phoenix, AZ 85022, 602/971-0990.

How you connect this supply to your ZX/TS depends on your system.

1) Use the transformer, bridge rectifier and 2200 mF filter capacitor outside your ZX/TS. This ups the 9V current rating only.

2) Or build a really professional circuit with a double pole switch on the 5V and 9V lines. Then you can use either the new supply or your old wall pack. You may want this since some devices, such as Zebra's light pen, lie in line with the wall pack (you cannot use it any other way).

Paul Donnelly, Centerport, NY

At SYNTAX, we built option #2 using the following special parts (in addition to the Arizona supply). We used in-line connectors and flying leads to connect the power--you may prefer a chassis-mounting jack.

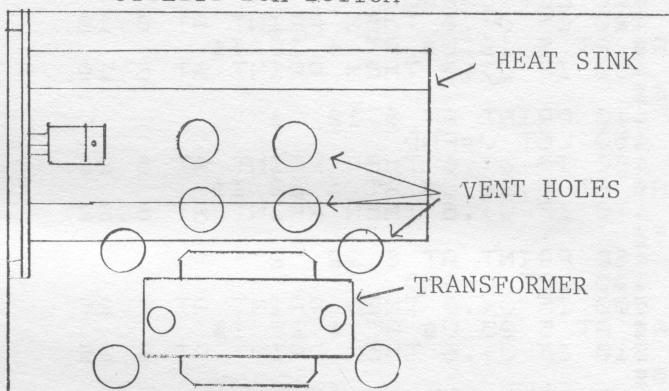
#	description	RS #	price
1	power cord	278-1255	\$.79
1	3-conductor jack	274-274	.90
1	3-conductor plug	274-284	.85
1	metal utility box	270-253	4.79
1	DPDT switch	275-666	1.29

			\$8.62

We placed the transformer and heat sink in a box as shown in the diagram. Drill air inlet holes in the box bottom, placed as shown by circles. Make enough holes to equal the vent area--2.2 sq. in.

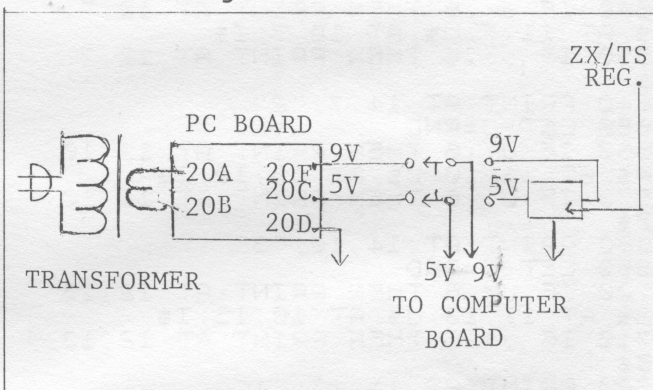
To get 9V, jumper the circuit side of the board from the 9V pin of the regulator to pin 20E.

UTILITY BOX BOTTOM



Space the circuit board from the side of the box with 1/4 in. thick insulating spacers. Bolt the transformer to the bottom. Mount the circuit board, regulator up, near the box top to place the heat sink near the top side vents.

Next solder the power supply together as shown in the following circuit diagram:



Wire the 3-conductor plug and jack so the tip carries 5V; the middle, 9V and the sleeve, 0V.

To connect to your computer, unsolder the 9V and 5V pins of the ZX/TS regulator, bend them upward and wire one end of the switch to these pins. Next, wire and solder the switch arms (center poles) to the circuit where the regulator

pins were. Then solder the 5V and 9V from the jack for the Arizona supply to the other switch end. Solder the ground lead from the 3-circuit connector to ground.

WARNINGS: 1) Never plug in both supplies at the same time. 2) Never interchange the 3-conductor plug with the ZX/TS plug.

Another advantage to this set-up: the switch becomes an ON/OFF switch. To cut the power off, just switch to the other (unplugged) power supply, then switch back to the one in use.--RWK

MC INKEY\$ SUBROUTINE--8K/1K

Sometimes when writing a BASIC program, you want to offer the user a menu choice of actions. Several methods let you input data, but often programmers prefer the INKEY\$ function. It does not require the user to press ENTER after his or her response. INKEY\$ does have its disadvantages--it's sometimes slow to respond. Additionally, if you program for novice users, you should remember that pressing the BREAK key causes your BASIC program to stop. An inexperienced user may not be able to start the program again without destroying data (if not the program itself).

This machine code routine returns the CODE value of the key pressed to your BASIC program. You can POKE it to ignore any entries except for given low and high parameters. This routine shows how to use the ROM subroutines that scan the keyboard and the routine that decodes the scan.

Before calling this routine, put the computer in SLOW mode as the display disappears if RUN in FAST. You can relocate the subroutine anywhere; it's usable in any location because it contains all relative jump instructions.

Start by entering the BASIC program shown in Listing 1. Now, hit RUN then ENTER without entering a line number.

```

1 REM 12345678901234567890123
45678901
100 LET X=16514
110 LET A=0
120 FOR K=0 TO 30
130 PRINT (X+K); " ";
140 INPUT B
150 POKE (X+K),B
160 PRINT PEEK (X+K)
170 LET A=A+PEEK (X+K)
180 NEXT K
190 PRINT A
200 POKE 16510,0
210 STOP
SYNTACTIC SUM: 11580, 8K ROM

```

On the screen you'll see a memory address and an L prompt. In response to each prompt, carefully enter the decimal numbers from the following list, starting at the top and working from the left along each row. Hit ENTER after each #.

```

205 187 2 44 32 250 205
187 2 68 77 81 20 40
247 205 189 7 126 254 29

```

56

Now you should get an out-of-screen-memory report 5/130. Press CONT then ENTER, and type these #s.

```

233 254 38 48 229 78 6
0 201

```

You now see report 9/210 at the screen bottom. If you entered all the numbers correctly, the # 3600 appears just under the listing.

Press LIST and ENTER to see the listing again. The first line:

```

0 REM LN 64 IF LN 777=C R
UN LN 2AK FAST ? TAN

```

Now enter the demo program in Listing 2 and press RUN 100 ENTER.

```

1 SLOW
2 LET J=(USR 16514)-28
3 FAST
4 RETURN
100 PRINT "CHOOSE:"
110 PRINT "1. CHOICE ONE"
120 PRINT "2. CHOICE TWO"
130 PRINT "3. CHOICE THREE"
140 PRINT "4. CHOICE FOUR"
150 PRINT "5. CHOICE FIVE"
160 PRINT "6. CHOICE SIX"
170 PRINT "7. CHOICE SEVEN"
180 PRINT "8. CHOICE EIGHT"
190 PRINT "9. CHOICE NINE"
200 GOSUB 1
210 PRINT "CHOICE=" ;J
220 GOTO 200
SYNTACTIC SUM: 20000, 8K ROM

```

Try pressing keys 1-0 along the top row, then other keys on the keyboard. You see that the routine works; the computer now accepts only the choices displayed on the screen as valid input.

To change the parameters, or what input the computer will accept, enter these lines with no line number, substituting the proper values for low and high limit:

```
POKE 16534, CODE (low limit)
POKE 16538, CODE (high limit + one)
```

Remember to use the CODE and not the number itself. See the back of your ZX/TS manual for a complete list of the character set codes.

Following is a commented list of the machine language in this subroutine.

Barry Boyer, West York, PA

Decimal Address	Decimal	Hex	Mnemonic	Comments
START 16514	205 187 2	CDBB02	Call 02BBH	;Call ROM scan keyboard ;routine.
16517	44	2C	INC L	;Check if user's finger ;on key.
16518	32 250	20FA	JR NZ, START	;If so, go back and check ;again.
AGAIN 16520	205 187 2	CDBB02	Call 02BBH	;Call ROM scan keybd.
16523	68	44	LD B, H	;Pass result of keybd
16524	77	4D	LD C, L	;scan in HL to BC.
16525	81	51	LD D, C	;Use D reg. to check for
16526	20	14	INC D	;no entry (no entry ;C=FFh).
16527	40 247	28F7	JR Z, AGAIN	;If D=0 then C must have ;been FFh. Scan again.
16529	205 189 7	CDBD07	Call 07BDH	;Call ROM decode keybd ;routine.
16532	126	7E	LD A, (HL)	;HL now contains <u>address</u> ;pointing to keybd input, ;thus we load <u>contents</u> of ;this address into accum. ;Compare to low parameter.
16533	254 29	FE1D	CP 1DH	
16535	56 233	38E9	JR C, START	;If carry set, then input ;is below low parameter.
16537	254 38	FE26	CP 26H	;Else, check high ;parameter.
16539	48 229	30E5	JR NC, START	;If carry not set, then ;input is above high ;parameter.
16541	78	4E	LD C, (HL)	;Else, input OK. Load into ;C register.
16542	06 00	0600	LD B, 00	;Clear B register to 0 as ;the BC register is the ;value returned to BASIC ;calling routine.
16544	201	C9	RET	;Return to BASIC.

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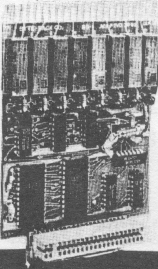
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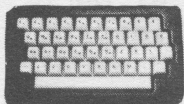
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BOOK REVIEW

Title: ZX81/Timex
Programming in BASIC
& Machine Language
Author: Ekkehard Floegel
Publisher: Elcomp
POB 1194
Pomona, CA 91769
Price: \$9.95, 139 pps.

Programming takes up where your ZX/TS manual leaves off; the book assumes you know the basics of ZX/TS hardware and software.

Beginning chapters include game, graphic, educational, and data management programs. Eight game programs and the "vehicle log book program" nicely illustrate some good programming techniques (arrays and decimal point alignment). The author provides good programs that create basic graphics motion, along with programs for falling bodies, shooting objects, plotting and vector effects of gravity and horizontal velocity (i.e. mortar shots). Unfortunately, these contain many typographical errors. Chapter four covers school programs, including 12 mathematical programs. Well written data management programs clearly show how to set up, maintain and sort data files.

Unfortunately, Floegel gives only a brief discussion of machine language, in chapter six. This chapter serves mostly those who already have some idea of how to use ML. A good, short ML monitor program enhances the ML section. About 30% of the book discusses machine language.

Chapters seven and eight discuss the Z80 PIO chip, and provide a complete schematic for construction of an inexpensive I/O board, with software. Although the author refers to a special set of prototype boards, you could use almost any ACE (all circuit evaluator, or white board) to build the three-chip I/O port.

Despite grammatical errors such as choppy sentences, wrong word order, and singular word forms for plural (due to translation from the original German) and style (half-size, typed pages) the book remains quite readable. Good BASIC routines, the ML monitor program and a simple I/O port proposal justify this book's \$9.95 price tag (fixing the many typos would increase its value).

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